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the correct one. The Archæan limestone and iron-ore beds of New York are likewise considered to be Huronian."

Succeeding the Huronian, a great formation, 40,000 or 45,000 feet in thickness, of which probably three-fourths is igneous material, and known locally as the Keewenawan period, is described. This is supposed to represent the Acadian rocks of the Atlantic border of New England and the provinces, and probably the Lower Cambrian formations of Great Britain and Bohemia.

The author discards the term period, and we think more logically regards the Laurentian and Huronian as ages, remarking: "In standard works on geology it is customary to dismiss all that precedes this era with a few pages devoted to the Laurentian and Huronian *periods*. In some, indeed, the latter age is not even separately recognized. When best considered these divisions are ranked as periods, and thus placed in the category of formations that often measure fewer hundreds of feet than these do thousands. Even in the more extended views presented in this sketch, relative injustice is done the earlier eras. In discussing the Laurentian, measuring as it does accumulations many thousands of feet in thickness, we only consider it as a whole, making no attempt at even an enumeration of the subordinate periods of deposition that marks its history. Even in describing the Huronian system we barely enumerate the successive thick deposits, though they embrace rich and varied accumulations of ore, carbon and lime, besides common detritus. Were these unmodified members of the later systems, they would doubtless be ranked as important periods, and the whole Huronian system would be graded as the equivalent of the Devonian age, or perhaps of the Mesozoic era."

For these and other reasons we like, on the whole, the author's tabular view of the geological eras, ages, periods and epochs.

The portion relating to the Quaternary age, particularly, gives a most useful and clear summary of glacial geology, especially in the Wisconsin and adjoining areas. Two glacial epochs are described, their existence clearly proven, and the colored restorations or theoretical maps of the two periods will be found to be most useful and timely. We have nowhere met with a clearer and more comprehensive exposition of the subject, and the proof that the great lakes were mainly excavated by ice seems, contrary to our own impression, quite reasonable. Space will not permit us to notice the work of the able collaborators of this survey, especially that of Mr. R. D. Irving, the late Moses Strong, Mr. R. P. Whitfield, Professors L. C. Wooster and F. H. King, and others. As they stand, the four volumes of this survey are a notable addition to our geological literature.

U. S. FISH COMMISSIONERS' REPORT FOR 1880.¹—The annual reports of the U. S. Fish Commission reach us each year, of just

¹*U. S. Commission of Fish and Fisheries.* Part VIII. Report of the Commission [S. F. Baird] for 1880. Washington, 1883. 8vo, pp. 1060.

so many pages, seldom, if ever, under a thousand, replete with matter of interest to naturalists and to fishermen, as well as to the general public, together with some padding to fill out the portly tome. The most notable zoölogical contribution is Mr. Goode's "Material for a history of the sword fish," a comprehensive account including a notice of the fisheries. It comprises ninety-nine pages and twenty-four plates, and is published rather to stimulate inquiry than as a complete monographic account of these fishes, so difficult to carefully study in nature. A large proportion of the report is filled with translations of foreign papers on different piscicultural topics.

ADOLPH'S MORPHOLOGY OF THE WINGS OF HYMENOPTERA.—This important memoir was published during the past year in the *Nova Acta* of the Imperial Leopold-Carolinian German Academy of Naturalists, under the title: "On the morphology of the wings of Hymenoptera. Forming a contribution to the question of the origin of species and of atavism." It is illustrated by six plates, five of which are filled with photograms of portions of wings, illustrating the variations and abnormalities in the venation. It is in continuation of an earlier similar work, published in 1882, on insect wings.

It is impossible to make an abstract of these interesting researches on the variation of venation, as the author does not present us with one. He closes the work, however, as follows: "The number of drones of *Apis mellifica* here studied amounts to 1918; of these 889 specimens with 2107 anomalies of thirty-eight different types or formations (bildungen) were surveyed in the most exact manner in tables, the remaining ones only with reference to the rarest forms. Three hundred and twenty-six worker bees and 125 queens were brought together for comparison. Among isolated deviations have occurred only those figured on Taf. 5, fig 2; Taf. 4, fig 5, and these indeed have a noteworthy relation to the allied kinds of venation. All the other anomalies are united in a strong normal relation. * * * Until the present time the venation has been used only for systematic uses. But now they have an interest from other points of view, and especially valuable are these abnormal formations which are opposed to artificial specifications and break over the limits to species which our comprehension of Nature has raised. It would be difficult to find a species which affords so rich a mine as the drones of *Apis mellifica*. But much is accomplished if we no more hastily throw aside, but consider it worth while to give thoughtful consideration to and compare them with other—be they normal or deformed—venations. In the Hymenoptera especially is the use of the venation in the discrimination of species nearly exhausted. There is a possibility still open, through these researches, of opening a new line of inquiry, whose perspective reaches far beyond the consideration of purely entomological questions."